

CLAIMS

What is claimed is:

1. In a queue having a plurality of cells, a method comprising:
 - receiving a first tag identifying a first storage location of a first information packet, and a corresponding second tag identifying a relative priority for the first information packet;
 - storing said first tag and said second tag in a first stage of a first queue cell;
 - receiving a third tag identifying a second storage location of a second information packet, and a corresponding fourth tag identifying a relative priority for the second information packet;
 - receiving by said first queue cell, a first control signal representing one of at least a pop operation and a push operation, wherein said pop operation causes said first and second tags to be passed to a previous one of said plurality of cells, and wherein said push operation causes said second tag to be compared to said fourth tag to determine a relative order of precedence between said first and second information packets, wherein said third and fourth tags are stored in a second stage of said first cell if said first information packet is awarded precedence based at least in part upon said comparison, and wherein said first and second tags are stored in said second stage of said first cell while said third and fourth tags are stored in said first stage of said first cell if said second information packet is awarded precedence based at least in part upon said comparison; and

propagating said first control signal representing one said pop and push operation to a subsequent one of said plurality of cells.

2. The method of claim 1, wherein said first and second information packets are derived from a common data flow.

3. The method of claim 1, wherein said first and second information packets are derived from different data flows.

4. The method of claim 1, wherein if said first cell forms a head of said queue said first control signal is received from a traffic management unit, and if said first cell forms a tail of said queue, then said control signal is received from an immediately preceding cell.

5. The method of claim 4, further comprising:

forwarding either the first and second tags or the third and fourth tags depending upon the determined order of precedence, from the second stage of said first cell to a next subsequent cell if said first cell is not the tail of said queue; and

dropping either said first information packet or said second information packet depending upon the determined order of precedence, if said first cell is the tail of said queue.

6. The method of claim 1, wherein said second information packet is awarded precedence if said fourth tag is determined to be greater than said second tag.
7. The method of claim 1, wherein said first information packet is awarded precedence if said second tag is determined to be greater than said fourth tag.
8. The method of claim 1, wherein said pop operation is immediately followed by said push operation and wherein said push operation is immediately followed by one of said push operation and said pop operation.
9. The method of claim 1, wherein said pop operation further causes a fifth tag identifying a third storage location of a third information packet, and a corresponding sixth tag identifying a relative priority for the third information packet to be passed from said next subsequent cell to the first cell.
10. A scheduling queue comprising:
a plurality of sequentially coupled storage cells including at least a first storage cell having first sequential logic to store either a first pointer indicating a storage location of a newly received information packet and a corresponding first identifier indicating a priority level for the newly received information packet, or a second pointer indicating a storage location of a previously received information

packet and corresponding second identifier indicating a priority level for the previously received information packet;

a first selector pair coupled to said first sequential logic to selectively pass to said first sequential logic, either said first pointer and corresponding first identifier, or said second pointer and corresponding second identifier based at least in part upon a control signal received from a previous one of said plurality of sequentially coupled storage cells;

a comparator coupled to said first sequential logic to perform a comparison between contents of said first sequential logic and the first identifier, based at least in part upon said control signal;

a second selector pair coupled between the first sequential logic and second sequential logic to pass either the contents of said first sequential logic, or the first pointer and corresponding first identifier to the second sequential logic for forwarding to a subsequent cell based at least in part upon said comparison; and

control logic to propagate said control signal to said subsequent cell.

11. The scheduling queue of claim 10, wherein said newly received information packet and said previously received information packet are derived from a common data flow.

12. The scheduling queue of claim 10, wherein said newly received information packet and said previously received information packet are derived from different data flows.
13. The scheduling queue of claim 10, wherein if said first cell forms a head of said queue said first control signal is received from a traffic management unit coupled to said scheduling queue, and if said first cell forms a tail of said queue, said control signal is received from a next previous cell.
14. The scheduling queue of claim 10, wherein said comparison is performed when said control signal indicates a push operation and said comparison is not performed when said control signal indicates a pop operation.
15. The scheduling queue of claim 10, further comprising an empty cell indicator to indicate whether said first storage cell is associated with a currently stored information packet, and wherein said comparison is performed only when said first storage cell is associated with a currently stored information packet.
16. The scheduling queue of claim 10, wherein said first sequential logic comprises a first latch pair to store said first pointer and said first identifier, and said second sequential logic comprises a second latch pair to store said second pointer and said second identifier

17. The scheduling queue of claim 10, wherein the storage location of said newly received information packet and the storage location of the previously received information packet are external to said scheduling queue.

18. An integrated circuit comprising:

a plurality of sequentially coupled storage cells including at least a first storage cell having first storage means to store either a first pointer indicating a storage location of a newly received information packet and a corresponding first identifier indicating a priority level for the newly received information packet, or a second pointer indicating a storage location of a previously received information packet and corresponding second identifier indicating a priority level for the previously received information packet;

a first selection means coupled to said first storage means to selectively pass to said first storage means, either said first pointer and corresponding first identifier, or said second pointer and corresponding second identifier based at least in part upon a control signal received from a previous one of said plurality of sequentially coupled storage cells;

first comparison means coupled to said first storage means to perform a comparison between contents of said first storage means and the first identifier, based at least in part upon said control signal;

second selection means coupled between the first storage means and second storage means to pass either the contents of said first storage means, or the first pointer and corresponding first identifier to the second sequential logic

for forwarding to a subsequent cell based at least in part upon said comparison;
and

control means to propagate said control signal to said subsequent cell.

19. A hardware based scheduling queue comprising:

a plurality of sequentially connected cells each equipped with a plurality sequential logic and selectors to receive a pointer to a storage location of an information packet and a corresponding identifier indicating a priority level for the information packet from either a previous or a subsequent cell within the scheduling queue based at least in part upon a control signal propagated through the scheduling queue;

said control signal indicating one of a pop signal and a push signal, wherein said pop signal causes a first pointer and first identifier stored in a first cell to be copied into a previous cell, and wherein said push signal causes said first identifier to be compared with a second identifier corresponding to a second newly received information packet to determine a relative order of precedence between said first and second information packets;

said second identifier and corresponding second pointer being temporarily stored for presentation to said second cell if said second information packet is assigned a greater precedence than said first information packet; and

said first pointer and said first identifier being temporarily stored for presentation to said second cell, and said second identifier and corresponding second pointer being temporarily stored in the first cell in place of said first

pointer and first identifier, if said first information packet is assigned a greater precedence than said second information packet.

20. The integrated circuit of claim 19, wherein said newly received information packet and said previously received information packet are derived from a common data flow.

21. The integrated circuit of claim 19, wherein said newly received information packet and said previously received information packet are derived from different data flows.

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